Space Weather Forecast

Issued on Wednesday, 17 May 2023 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Slight chance of Moderate X-ray flares and R1/R2 radio blackouts, perhaps rising after midweek. Slight chance (10%) of G1 minor storm days 3 and 4 due to arrival of fast wind from a coronal hole.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been High over the last 24 hours, with the largest event a significant Moderate-class flare, which was observed at 16/1643 UTC, originating from a sunspot region which is yet to emerge onto the Earth-facing disc.

This region is expected to rotate onto the visible disc in the next 24 hours. Otherwise, X-ray activity has been confined to minor C-class flares. There are currently six numbered sunspot regions on the visible disc, with two unnumbered regions. The sunspot group located in the northeast (just west of the meridian line) is the largest and most magnetically complex. However, this region has not shown any significant flare activity in the last 24 hours, and appears to be relatively stable.

Surprisingly, only a very faint Coronal Mass Ejection (CME) has emerged off the SE limb following the recent significant Moderate-class flare, which is yet to be analysed. However, coincidently a partial halo CME emerged off the north and west limb following the event, which has been analysed and is considered to be far-sided, with no Earth-directed component. The partial halo CME may be associated with a recently departed active sunspot group, which is now on the far-side of the Sun. No Earth-directed CMEs have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind speed has been a slightly elevated levels throughout, although the mechanism for this is not certain, but maybe connected to a high latitude coronal hole fast wind i.e. one that does not have a particularly direct route to affect Earth - instead largely passing over the track of the Earth's orbit. The net effect of the above solar wind measures was for Quiet to Unsettled geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity will be initially Low, with a Chance of becoming Moderate after midweek UTC, with the expected arrival of a CME-producing sunspot region over the southeast limb, with no significant regions departing off the disc.

Solar Wind / Geomagnetic Activity: No CMEs now feature in the four-day forecast.
Beyond the possible current marginal influence of the high latitude coronal hole, the only coronal hole fast wind due in the four days is minor and mooted for Friday 19 May. Although this is the peak risk of G1/minor storm for the period as a whole, it only offers a slight chance of Minor Geomagnetic Storm G1, with Quiet conditions predominant until then.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

Met Office Space Weather Forecast

Energetic Particles / Solar Radiation: No solar radiation storms are expected - although after the recent Moderate-class flare in the southeast, a slight risk of a minor solar radiation storm remains for day 1 (17 May).

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	30	30	30	30
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.